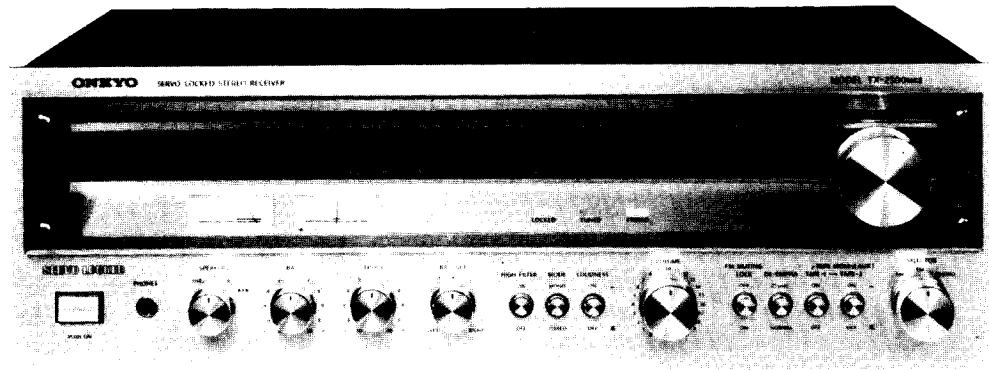


ONKYO SERVICE MANUAL

**SERVO LOCKED
FM/AM STEREO RECEIVER
MODEL TX-2500MK II**



**ONKYO®
AUDIO COMPONENTS**

SPECIFICATIONS

Amplifier section			
Power Output	40 watts per channel, min. RMS, at 8 ohms both channels driven, from 20 Hz to 20 kHz, with no more than 0.1% total harmonic distortion.	50 dB Quieting	FM mono: 17.2 dBf, 4 μ V
Total Harmonic Distortion	0.1% at rated power	Sensitivity	FM stereo: 37.2 dBf, 40 μ V
IM Distortion	0.08% at 1 watt output	Intermediate frequency	FM: 10.7 MHz
Damping Factor	0.3% at rated power	Capture Ratio	AM: 455 kHz
Frequency Response	0.1% at 1 watt output	Image Rejection Ratio	FM: 2 dB
Sensitivity and Impedance	40 at 8 ohms	IF Rejection Ratio	AM: 45 dB
	20 ~ 30,000 Hz (± 1 dB)	Spurious Rejection	FM: 80 dB
	PHONO: 2.5 mV 50 kohms	Signal to Noise Ratio	AM: 30 dB
	TAPE PLAY: 150 mV 50 kohms	ACA	FM: 1/2 IF 80 dB
	TAPE REC: 150 mV 3.5 kohms (PHONO)	AM Suppression Ratio	FM mono: 65 dB
Phono Overload	150 mV RMS at 1 kHz 0.1% THD.	Harmonic Distortion	FM stereo: 60 dB
Treble Control	± 10 dB at 10 kHz		AM: 40 dB
Bass Control	± 12 dB at 100 Hz	Frequency Response	FM: 60 dB
Signal to Noise Ratio	PHONO: 85 dB (at 10 mV input IHF A network)		FM: 50 dB
	65 dB (IHF C network)	Stereo Separation	FM mono: 0.2%
	TAPE: 95 dB (IHF A network)		FM stereo: 0.4%
	90 dB (IHF C network)		AM: 0.8%
High Filter	6 kHz 6 dB/oct.	Frequency Response	FM: 30 ~ 15,000 Hz
Loudness (-30 dB)	+9 dB at 40 Hz		+0.5, -2 dB
	+5 dB at 20 kHz	Stereo Separation	37 dB at 1 kHz
			30 dB at 100 ~ 10,000 Hz
Tuner section		Muting Level	FM: 14.7 dBf, 3 μ V
Tuning Range	FM: 88 ~ 108 MHz	Stereo Threshold	FM: 14.7 dBf, 3 μ V
	AM: 530 ~ 1605 kHz	Locked Level	FM: 14.7 dBf, 3 μ V
Usable Sensitivity	FM mono: 11.2 dBf, 2 μ V	Tuning Meter	Signal strength & Center tuning
	FM stereo: 19.2 dBf, 5 μ V		
	AM: 25 μ V	General	
		Power Supply	AC 120 volts 60 Hz 130 watts
		Dimensions	19" W x 6-5/16" H x 14-5/8" D
		Weight	483mmW x 160mmH x 371mmD
		Semiconductors	25.3 lbs. 11.5 kg.
			1 FET, 30 Transistors, 8 ICs, 28 Diodes

Specifications are subject to change without notice for improvement.

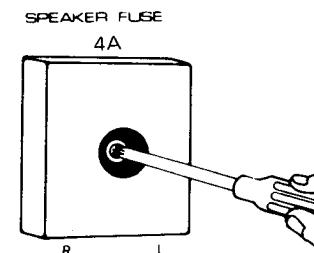
SERVICE NOTES

1. REPLACEMENT OF THE AC FUSE

- 1) Remove four screws holding leg and bottom board.
- 2) Remove five screws holding bottom board and side bracket.
- 3) Replace the AC fuse on the power supply p.c.b.

2. REPLACEMENT OF THE SPEAKER PROTECTION FUSE

- 1) Remove a screw holding the cover and back panel and remove the cover.
- 2) Replace the fuse with indicial 4-ampere types.
3. When replacing differential amplifier or push-pull amplifier transistors, be sure that transistors of one channel have the same h_{FE} ratings.
4. If the TUNED lamp does not turn off when you touch the tuning knob, this may be due to strong signals generated by a nearby MW or SW broadcasting station. In this case, adjust the frequency of oscillator coil with L201 until the TUNED lamp turn off.



5. REMOVAL OF THE FRONT PANEL

- 1) Remove four screws holding top cover and chassis.
- 2) Remove two screws holding top cover and back panel.
- 3) Remove five screws holding front panel and front bracket.
- 4) Pull out all control knobs.

6. REMOVAL OF THE DIAL GLASS

- 1) Remove four screws holding dial glass and front panel.

NOTES: The dial glass has been mounted by applying an 800gr torque to the screws. If the dial glass is removed during repairs, and a torque driver is available, apply 800gr torque to the screws when replacing. If, however, a torque driver is not available, simply tighten the screws by hand.

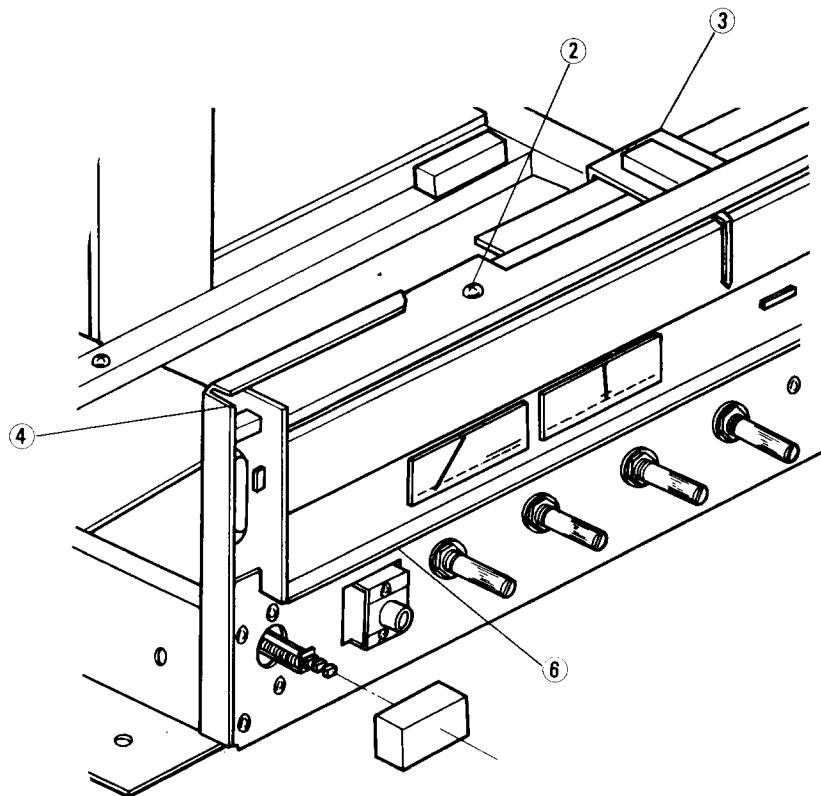
When replacing the dial glass, insert all relevant component parts in accordance with the cross-sectional diagram.

7. REPLACEMENT OF INDICATOR LAMPS

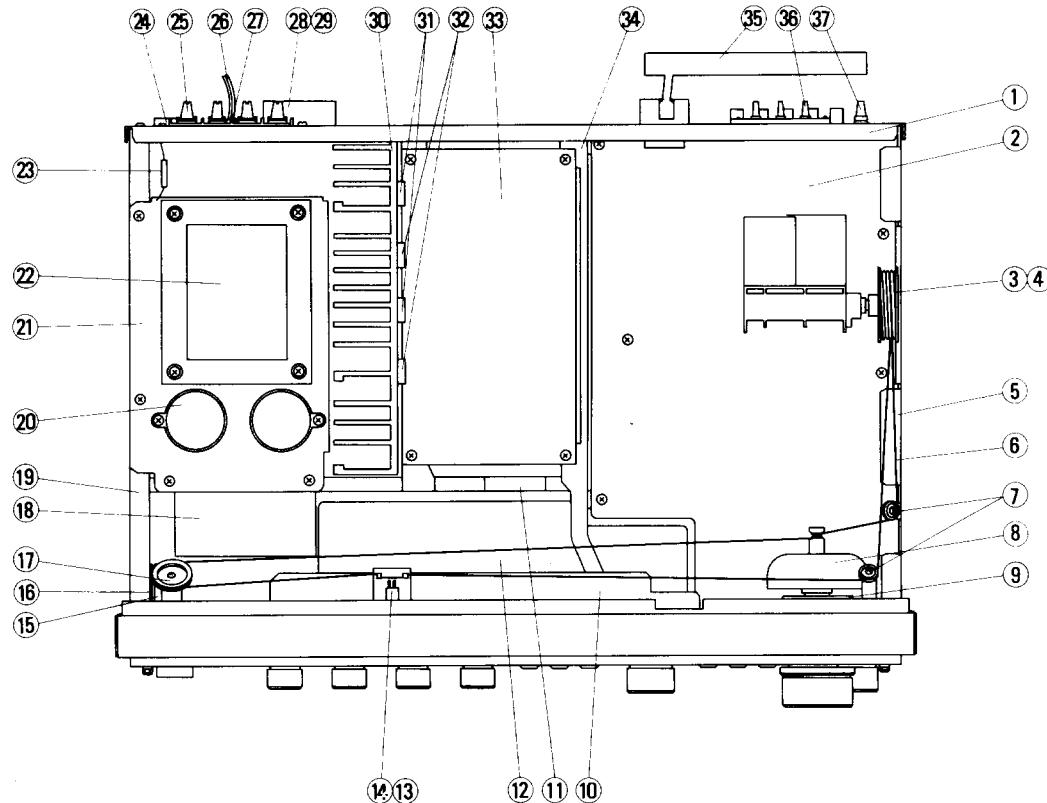
All indicator lamps are linked to their respective lamp covers. So when replacing, remove the defective lamp from the front bracket with its cover in place.

8. REPLACING THE METER

- 1) Remove the top cover and the front panel.
- 2) Remove the two screws securing the illumination bracket and front bracket.
- 3) Remove the pointer ass'y from the front bracket.
- 4) Remove the 2 sets of screws securing the left and right lamp covers and dial plate covers to the front bracket.
- 5) Move the front panel out, keeping the dial plate cover held against the dial plate, and remove the 2 (left and right) lamp PC boards. Then remove the dial plate from the drive shaft.
- 6) Remove the 3 screws securing the front cover to the back plate.
- 7) The top sides of the meter covers are fastened to the back plate by adhesive tape. Remove this tape, taking care not to jar or knock the meters.



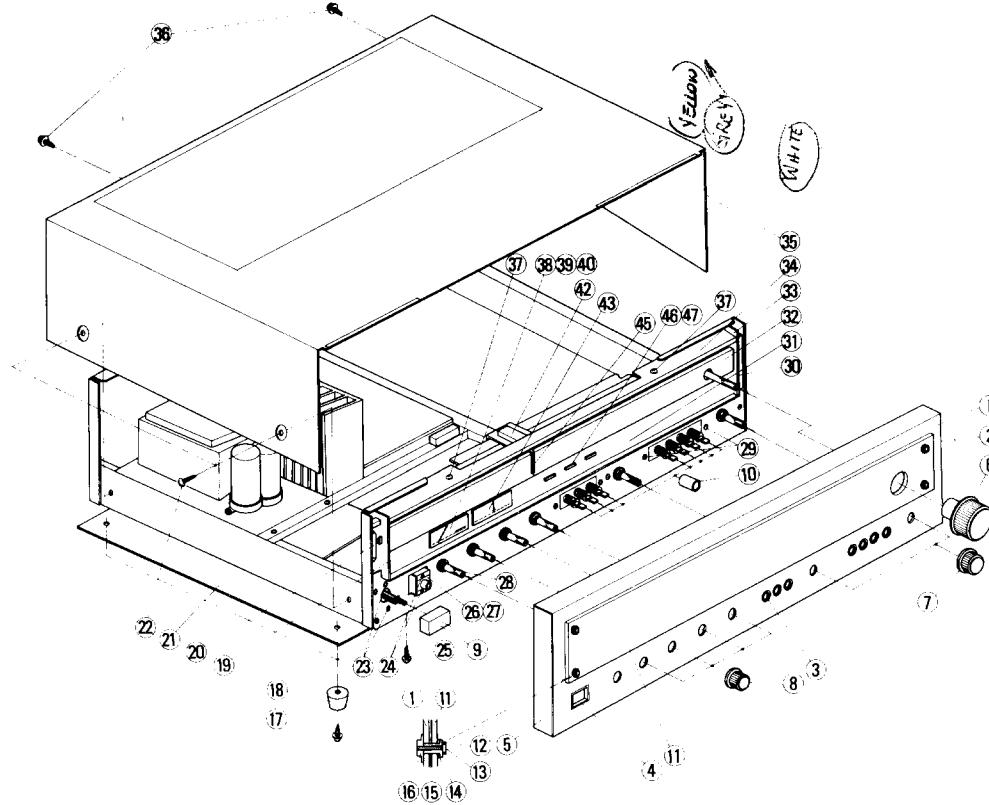
COMPONENT LOCATION



COMPONENT LOCATION-PARTS LIST

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION	REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	A081	27120114	Back panel	20	C908, C909	3504107	8,200 μ F, 50V, Elect. capacitor
2		13719570	NARFE-470, AM/FM tuner and equalizer ampli. p.c.b.	21	A060	27130125	Bracket, transformer
3	A075	27200019	Dial drum	22		230236	NPT-639D, Power transformer
4	A077	273803	SP-14A, Spring for dial drum	23	R801	431523355	3.3M Ω , 1/2W, Solid resistor
5	A035	27115030	Side bracket	24	P901, P902	25050008A	S-I6432, AC outlet
6	A078	273903	200mm, Dial cord	25	P805, P806	25060026	NTM-4PRMN03, Speaker terminal
7	A005	27185002	DP-16N, Dial pulley	26	W901	253072	AS-UC, Power supply cord
8	A002	27205013	Drive shaft	27	W901a	270025	SR-3P-4, Strainrelief
9	A003	27300071	Bearing	28	F501, F601	252014	4A-T, Speaker protector fuse
10	A001	27110056	Front bracket	29	F501a, F601a	25050004	Fuseholder with cover
11		250130	T-4461, Terminal	30	A070	27160035	Radiator
12		13719571	NAAF-471, Preampli. p.c.b.	31	Q505, Q605	2200822 or 2200823	2SD718 (R) or 2SD718 (O) Power ampli. transistor
13	PL808	210044	PL8V0.05AW-3, Pointer lamp	32	Q506, Q606	2200832 or 2200833	2SB688 (R) or 2SB688 (O) Power ampli. transistor
14	A012	27220009	Pointer slider ass'y	33		13719572	NADA-472, Power ampli. p.c.b.
15	S901	25035047	NPS-111L12P, Power switch	34	A046	27130126A	Bracket S
16	C951	3504012	0.01 μ F, 125V, UL capacitor	35		232066	NMA-3012, AM bar antenna
17	A004	27185001	DP-26N, Dial pulley	36	P804	25060020	NTM-3WPUN1, Antenna terminal
18		13719573	NAPS-473, Rectifier p.c.b.	37	P803	25060008	Ground terminal
19	A042	27115031	Side bracket				

EXPLODED VIEW



EXPLODED VIEW-PARTS LIST

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION	REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1 A501	13719121-1	Front panel ass'y (1-5)		25 A602	831130082	3STW+8BQ, Screw	
2 A502	27210095	Front panel		26 P807	25045018	LJ-100H, Stereo headphone jack	
3 A509	28125048	End cap R		27 R528, R628	441623314	330Ω, 1W, Metal oxide film resistor	
4 A508	27267026	Guide, push switch		28 S810	25030098	NRS-144-30Y, Speaker selector switch	
5 A503	27267027	Guide, power switch		29	82113006	3P+6F-N, Screw	
6 A801	28125049	End cap L		30	27300113	Lamp cover	
7 A802	28320242	Tuning knob		31 A010	28133007	Back plate	
8 A803	28320238	Volume knob		32 A013	28130063	Dial plate	
9 A804	28320237	Tone knob		33 A016	27300103	Dial plate cover	
10 A805	28320235	Power knob		34 A011	27240015	Illumination bracket	
11 A504	28320239	Push knob		35 A351	28184037	Top cover	
12 A505	28191024	Dial glass		36 A353	834430102	3STS+10BQ(BC), Tapping screw	
13 A506	27270014	Spacer		37	834430102	3STS+6BQ Screw	
14 A512	86213010	Screw		38 M102	243085	NIND-0500S85, Strength meter	
15 A511	870052	Washer		39 PL803, PL804	210041	PL8V0.15AW-2, Meter illumination lamp	
16 A507	870051	Washer		40 A007	27300114	Cushion	
17 A605	86213010	WN3×10FN, Nut		42 A022	28168002	Pointer cover	
18 A604	831130162	3STW+16BQ, Screw		43 M101	243084	NIND-0250S84, Center meter	
19 A015	280379	Leg		45 A009	28165042	Pointer	
20 A600	27300102	Dial plate cover		46 A017	28198512	Facet	
21 A600	13719574	NAPL-474, Dial illumination p.c.b.		47 PL805-PL807	210040	PL12V 30mV, Stereo/Locked/Tuned indicator lamp	
22 A352	27170041	Bottom board					
23 A028	838440109	4TTB+10C (BC), Screw					
24 A023	834130062	3STS+6BQ, Screw					
	801105	8W3P+6FN, Screw					

ALIGNMENT PROCEDURES

INSTRUMENTS REQUIRED

1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
6. Monitorscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 1kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
3. Standard knob position

SPEAKERS	A
BASS, TREBLE & BALANCE	Center
HIGH FILTER	OFF
MODE	STEREO
DE-EMPHA	NORMAL
LOUDNESS	OFF
MUTING LOCK	OFF
TAPE 1, 2	OFF (SOURCE)

(1) IDLING CURRENT ADJUSTMENT

Connect the DC Voltmeter between ID and CT terminals.

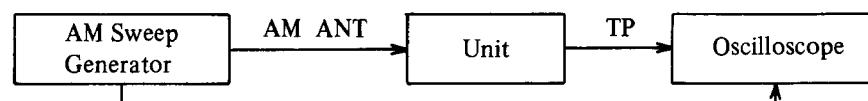
Adjust the voltage to $20\pm 5\text{mV}$ with **R513** (Left channel)

Adjust the voltage to 20 ± 5 mV with R613 (Right channel)

NOTES: Adjust after switching on for 10 minutes.

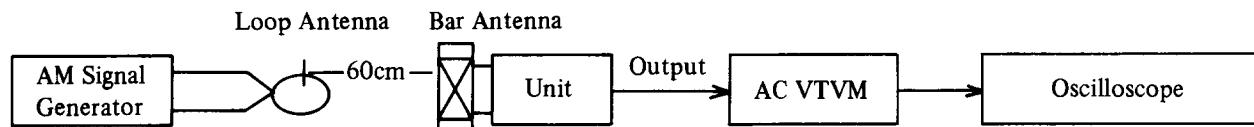
(2) AM IF ALIGNMENT

1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



Set signal	Adjust	Oscilloscope	Remarks
455kHz	X103	Maximum Symmetrical Response	Usually not necessary to adjust

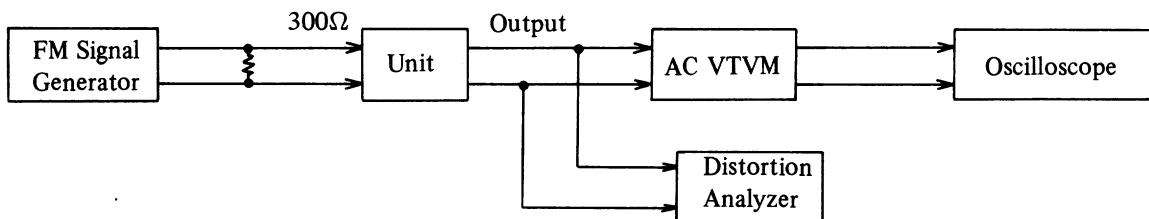
(3) AM RF ALIGNMENT



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515kHz 400Hz 30%	Lower end (515kHz)	L103	Maximum	Repeat step 1 and 2 as necessary
2	1680kHz 400Hz 30%	Upper end (1680kHz)	TC002	Maximum	
3	600kHz 400Hz 30%	600kHz	L007	Maximum	Repeat step 3 and 4 as necessary
4	1400kHz 400Hz 30%	1400kHz	TC001	Maximum	

(4) FM FRONT END ALIGNMENT

1. Set SELECTOR switch to FM.
2. Connect FM Signal Generator to 300-ohm antenna terminals.

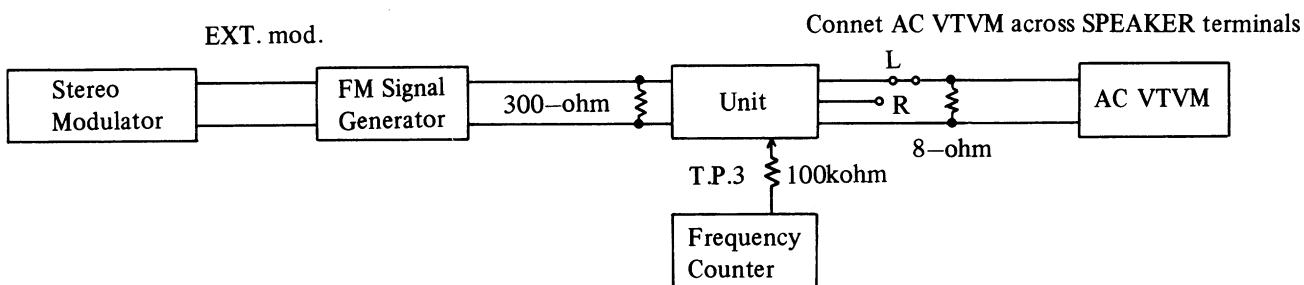


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	T101 Bottom	Tuning Indicator	Center	Repeat Steps 1 and 2 as necessary
2	98MHz 65dBf 1kHz 75kHz div.	98MHz	T101 Top	Distortion Analyzer	Minimum	
3	90MHz 65dBf 1kHz 75kHz div.	90MHz	L004	Tuning Indicator	Center	Repeat Steps 3 and 4 as necessary
4	106MHz 65dBf 1kHz 75kHz div.	106MHz	TC005		Center	
5	90MHz 20dBf 1kHz 75kHz div.	90MHz	L001 L002	AC VTVM or Oscilloscope	Maximum	Repeat Steps 5 and 6 as necessary
6	106MHz 20dBf 1kHz 75kHz div.	106MHz	TC003 TC004		Maximum	
7	98MHz 65dBf 1kHz 75kHz div.	98MHz	T001	Distortion Analyzer	Minimum	

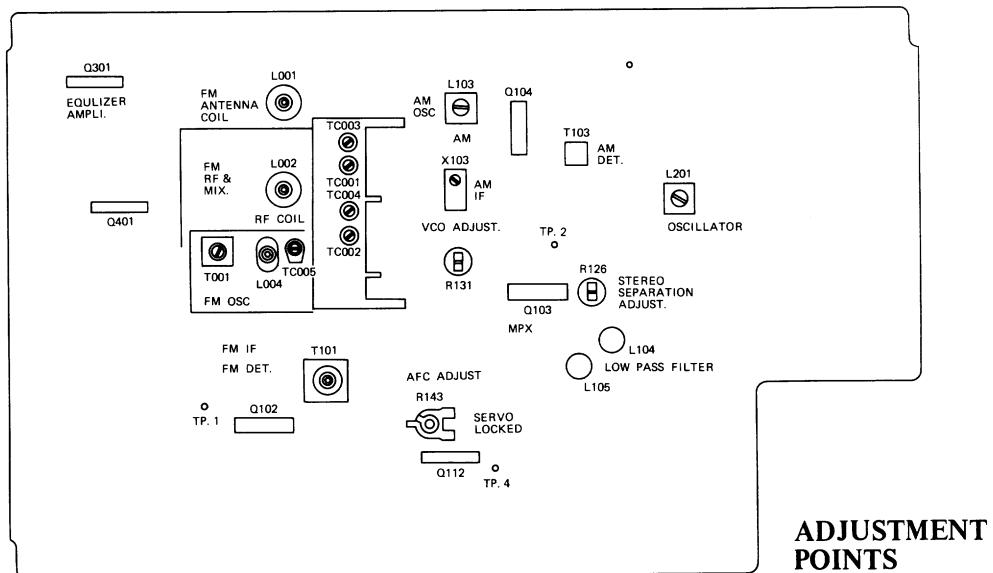
(5) SERVO LOCKED CIRCUIT ALIGNMENT

FM signal generator	Dial to set	FM muting switch	Adjust	Output Indicator	Adjust for
98MHz 65dBf 1kHz 75kHz div.	98MHz	Off	Tuning	Center Meter	Center
		On	R143		Center

(6) MULTIPLEX ALIGNMENT

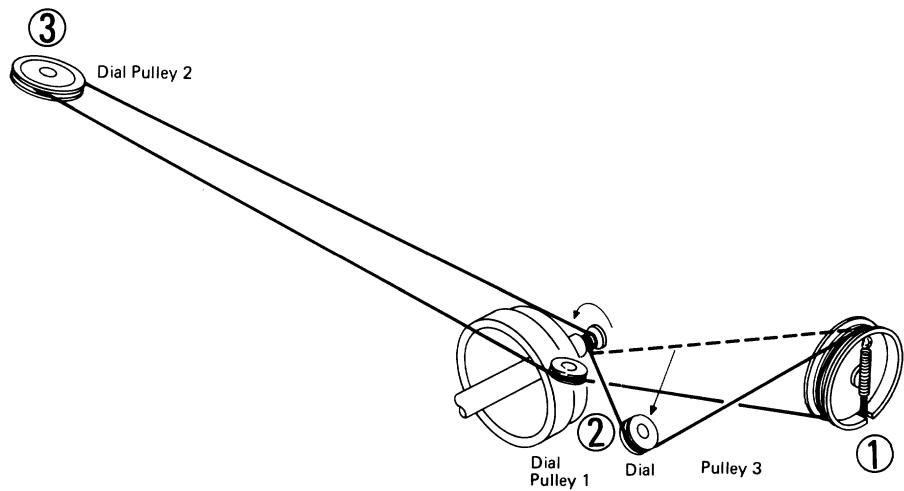


Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	98MHz no mod. 65dBf	—	98MHz	R131	Frequency Counter	19000±19Hz	
2	STEREO INDICATOR should light up when stereo program is being received.						
3	98MHz EXT. Mod. 65dBf	Pilot Sig. 9% Main & Sub Sig. 1KHz Lch 91%	98MHz	R126	AC VTVM Right ch.	Minimum	Repeat Steps 3 & 4 as necessary
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1KHz Rch 91%	98MHz	R126	AC VTVM Left ch.	Minimum	

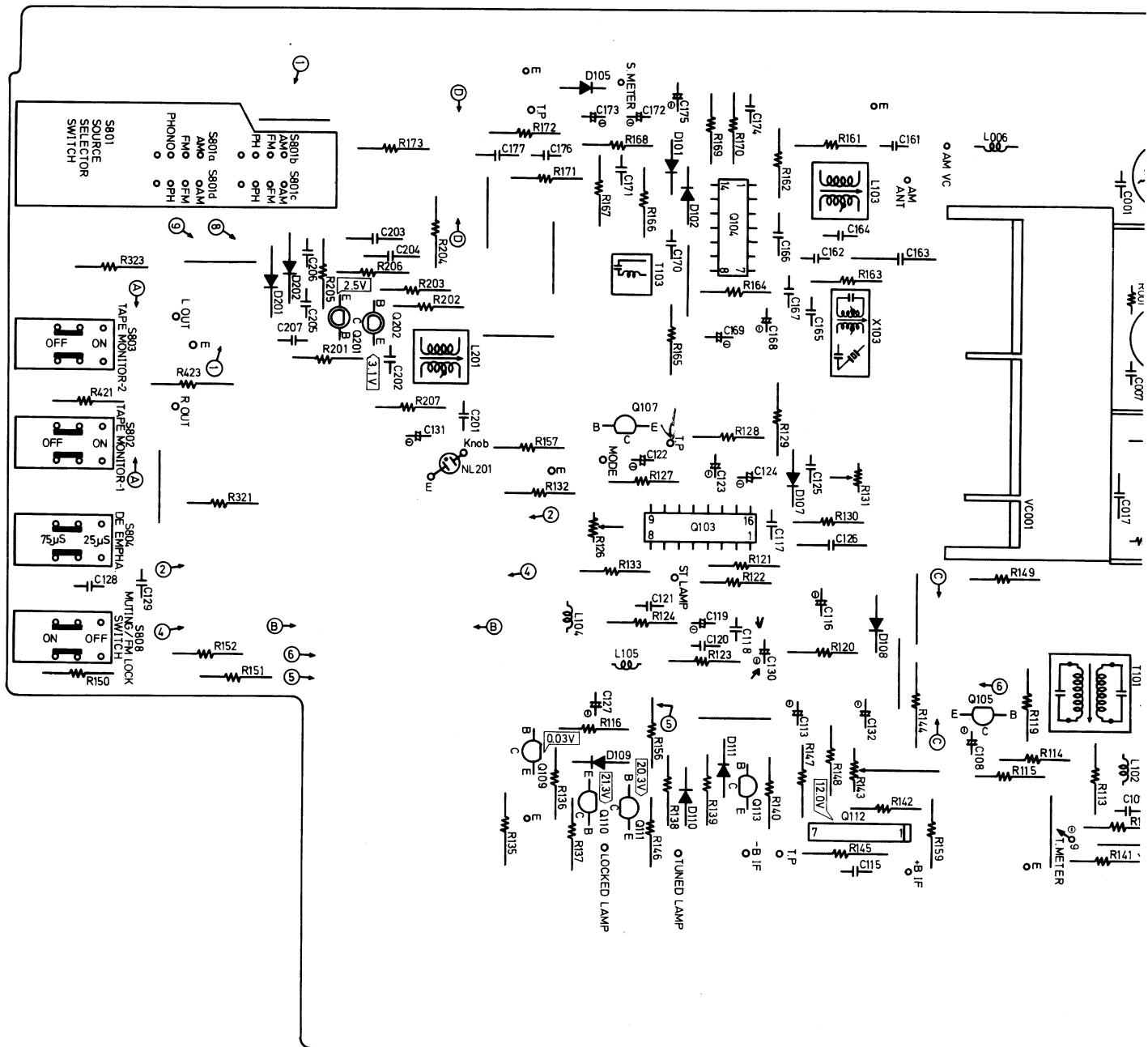


STRINGING DIAGRAM

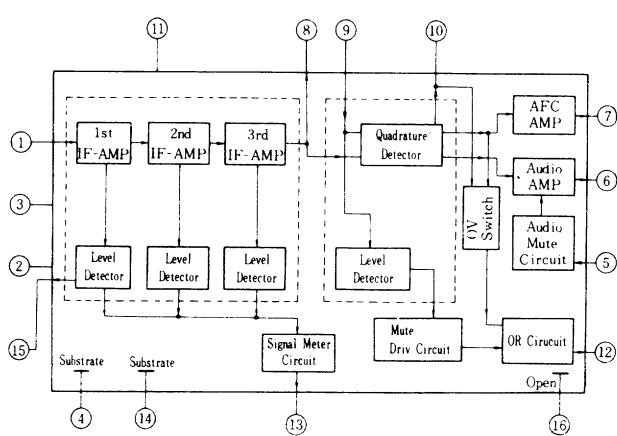
1. Close the variable capacitor complete and tie the dial cord to the spring of the drum.
2. Thread the dial cord in the direction of arrow from (1) to (3) and wind the dial cord three turns around the tuning shaft clockwise.
3. Wind the dial cord 1½ turns around the dial drum.
4. Thread the dial cord to the dial pulley 3.



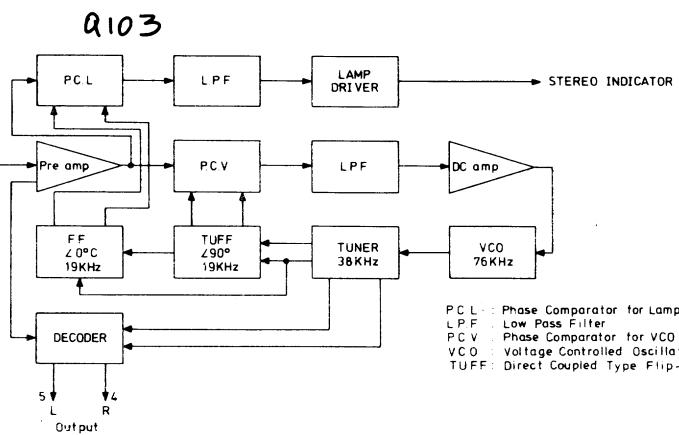
AM/FM TUNER AND EQUALIZER AMP. PC BOARD VIEW FROM BOTTOM SIDE



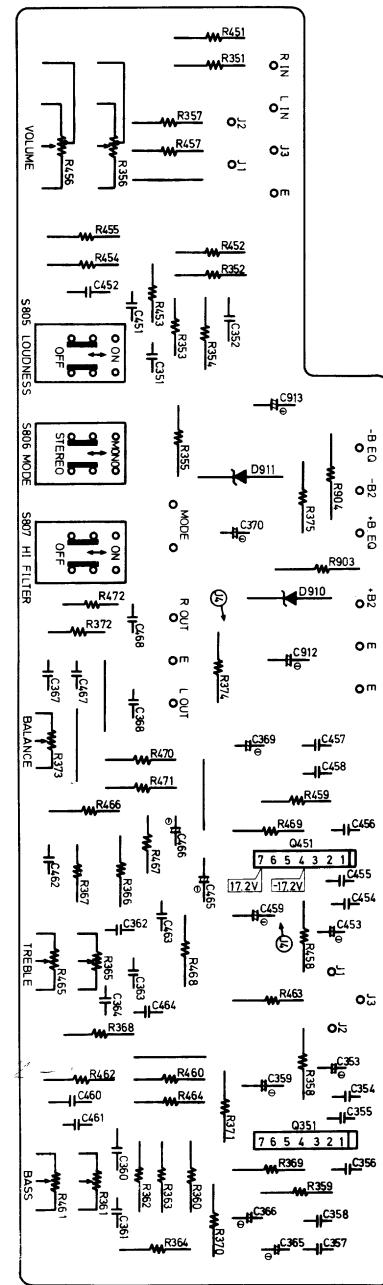
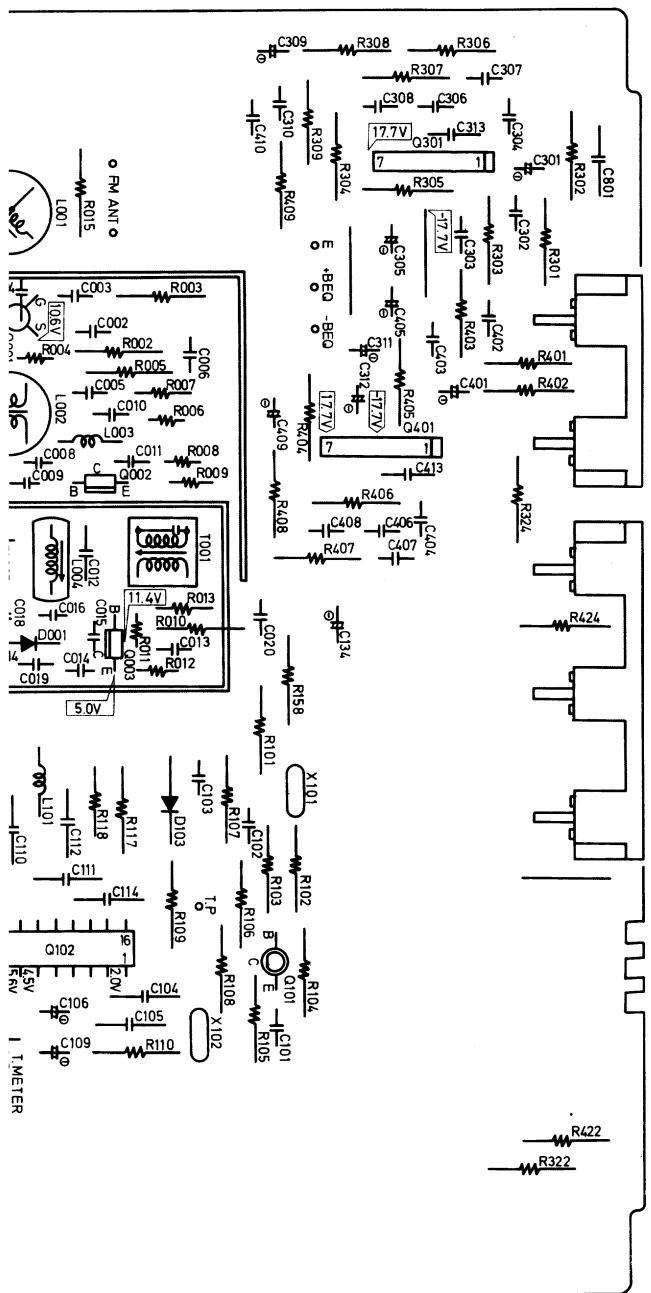
HA-1137 BLOCK DIAGRAM



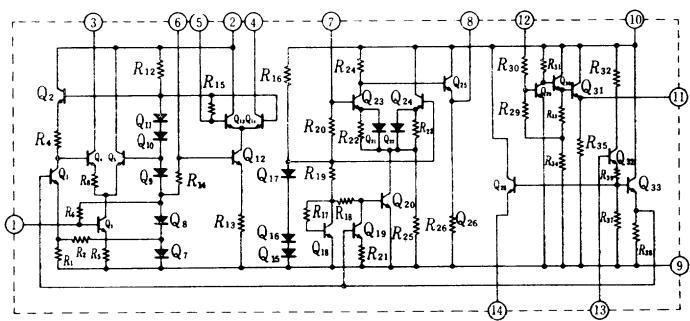
BA-1320 BLOCK DIAGRAM



PREAMP. PC BOARD VIEW FROM BOTTOM SIDE

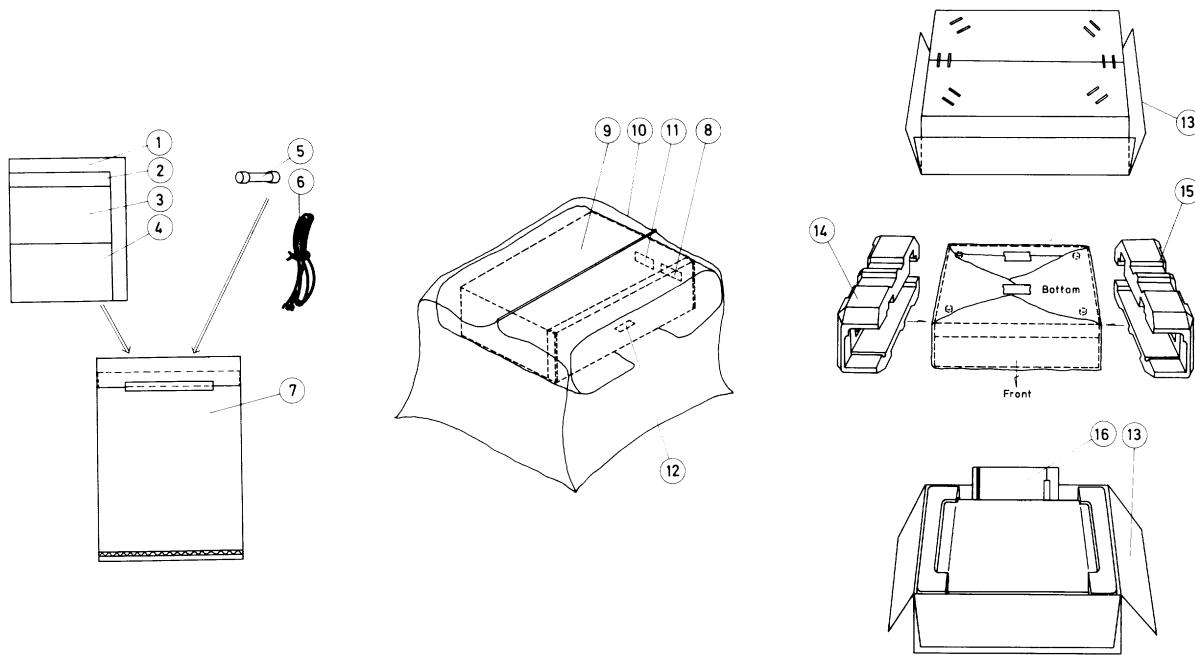


HA-1151 EQUIVALENT CIRCUIT



**VOLTAGE
MEASURED WITH
V.T.V.M
(NO INPUT SIGNAL)**

PACKING PROCEDURES



PARTS LIST

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	A881	29340257	Instruction manual
2	A889	29358001	Service station list
3	A885	29355046	Caution card, warranty
4	A882	29365003	Warranty card
5	A902	252014	4A-T, Fuse
6	A901	292064	5059-01, FM antenna
7	A861	29100006	Poly bag
8	A886	29360197	Label, cabinet composite
9	A855	290093	500x1,200, Protection sheet
10	A854	29100027A	850 x 650mm, Poly bag
11	A884	282969	Caution label
12	A883	293041	Caution card
13	A851	29050185	Carton box
14	A852	29090279	Pad R
15	A853	29090278	Pad L
16		13719119	Accessory bag

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Eastern Office

42-07 20th Avenue, Long Island City, New York 11105, U.S.A. Phone (212) 728-4639

Midwest Office

935 Silver Drive, Wooddale, Illinois 60191, U.S.A. Phone (312) 595-2970

PARTS LIST

Q701, Q702	2210085	2SC733 (GR) or T.K.C
Q703	2210670	2SC1681 (O-1)
	2210671	2SC1681 (O-2) or T.K.C
Q901	2200013	2SD235 (O)
Q902	2211254	2SD235 (Y) or Rectifier
	2211255	2SC1815 (Y)
	2211255	2SC1815 (GR) or Rectifier
DIODES		
DS01, D907	2238008	1S1885 or
	223849	ERB12-01 or
DS02	223921	WZ-210, Zener
D701	223123	1S2472
D702	223124	1S2473
CAPACITORS		
C501, C601	352780221	2.2μF, 50V, Elect.
C504, C604	352734701	47μF, 10V, Elect.
C508, C608	352784701	50μF, 50V, Elect.
C511, C611	352784711	470μF, 50V, Elect.
C512, C513	352780471	4.7μF, 50V, Elect.
C612, C613		
C703	352752211	220μF, 25V, Elect.
C704	352782211	220μF, 50V, Elect.
C915	352744701	47μF, 16V, Elect.
C916	352742211	220μF, 16V, Elect.
RESISTORS		
R511, R611	4000003	D22A, Thermistor
R515, R615	5225026	N10H4R70BD, Idling current adjustment
R517, R617	441622244	2.2kΩ, 1W, Metal oxide film
R522, R523	48394794	0.47Ω, 3W, Cement
R622, R623		
RADIATOR		
27160029		RAD-07, Radiator
COILS		
L501, L601	231001	S-1.3B

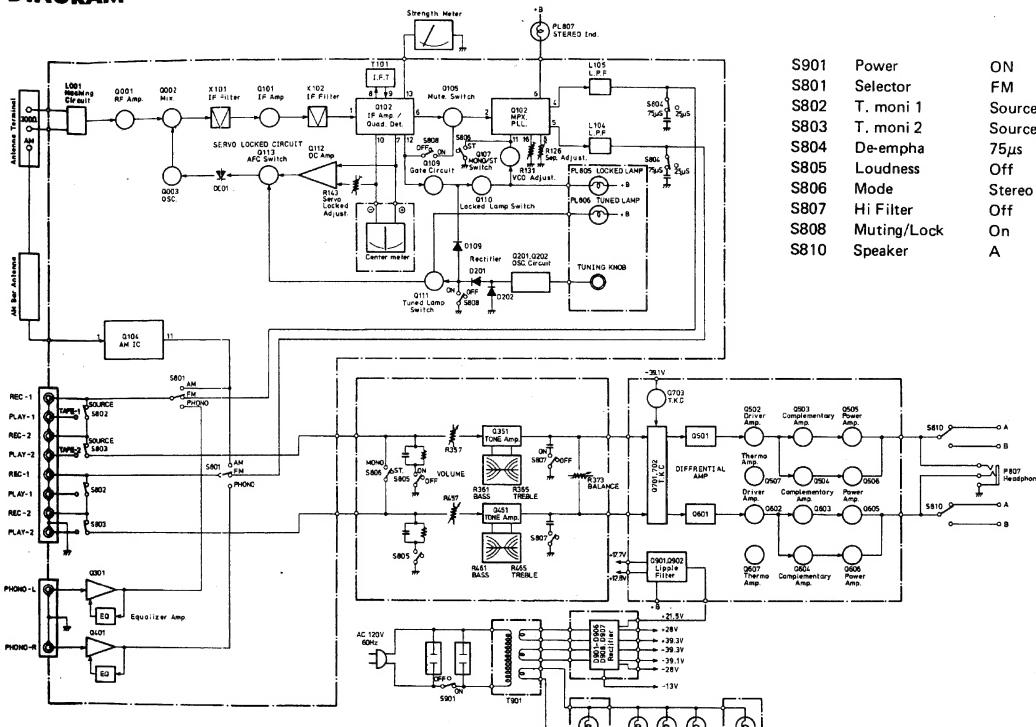
**RECTIFIER PC BOARD (NAPS-473) -
PARTS LIST**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
DIODES		
D901-D904	223841	GP-30G
D905, D906	223806 or 223807	1S1886 ERB12-02 or
D908, D909	223848, 223807	GP081, 1S1885
D912	223849 or 223810 223963 or	ERB12-01 or WZ-120 RD-12EB or
CAPACITORS		
C905	352782211	220μF, 50V, Elect.
C910, C911	352762211	220μF, 35V, Elect.
C914	352754711	470μF, 25V, Elect.
C917	352742211	220μF, 16V, Elect.
METAL OXIDE FILM RESISTORS		
R901, R902	441623614	360Ω, 1W
R912	441621524	1.5KΩ, 1W
R913	441721824	1.8KΩ, 2W
FUSE HOLDER		
	250113	S-N5051
FUSE		
F901	252049	4A ST-6, AC

**DIAL ILLUMINATION PC BOARD
(NAPL-474) - PARTS LIST**

P801 210039A 300mA, 8V, Dial illumination lamp

BLOCK DIAGRAM



NOTES:

WIRELESS CAPACITOR

LL: Low leakage current type electrolytic capacitor

ST: Polystren film capacitor

When replacing differential amplifier or push-pull amplifier transistors, be sure that transistors of one channel have same h_{fe} ratings.

CIRCUIT DESCRIPTION

1 Muting Circuit

The Quadrature detector IC incorporates an IF level detector circuit (output at pin 12). If the IF signal level drops below the muting level, pin 12 will be switched to high level, turning Q105 on. Consequently, the detector output signal will be cut off before it can be applied to the multiplex IC. When, on the other hand, the IF signal level is higher than the muting level, the Q102 pin 12 will be switched to low level, turning Q105, and Q109 off. Q110 will therefore turn on, followed by the LOCKED lamp turning on.

2. Servo Locked Circuit

The DC potential difference across both ends of the tuning meter (corresponding to the DC portion of the ratio detector output) is amplified by about 30dB by the Q112 operational amplifier in order to increase the AFC control capacity.

3 AFC Switching Circuit

In order to ensure accurate tuning, the AFC circuit is automatically disconnected as soon as the tuning knob is touched. The Q202 oscillator circuit generates a signal of approximately 6MHz which is amplified by Q201, and full-wave rectified by D201/D202. The DC portion of this signal is then employed in switching Q113 on and off. When tuned away from broadcasting stations, the Q109 collector will be at low level, thereby switching the Q111 base voltage to low level also. Q113 will consequently turn on, and the AFC circuit turn off. When tuned into a station, however, the Q111 base voltage will be switched to high level, thereby turning Q111, and the Tuned Lamp on. Q113 will turn off, and the AFC circuit turn on. If the tuning knob is then touched, the oscillator circuit will cease to generate signals, and the AFC circuit will turn off. Furthermore, the NL-201 neon lamp serves to prevent the destruction of transistors due to the presence of static electricity.